

**CC4700-2  
1/2-Inch  
Color Camera**

**Installation/  
Operation Manual**

**C1917M (12/97)**

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## REVISION HISTORY

<u>Manual #</u>	<u>Date</u>	<u>Comments</u>
C1917M	12/97	Original version.

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### 1.1 IMPORTANT SAFEGUARDS AND WARNINGS

Prior to installation and use of this product, the following WARNINGS should be observed.

1. Installation and servicing should only be done by Qualified Service Personnel and conform to all Local codes.
2. Only use replacement parts recommended by Pelco.
3. Unless the unit is specifically marked as a NEMA Type 3, 3R, 3S, 4, 4X, 6, or 6P enclosure, it is designed for indoor use only and it must not be installed where exposed to rain and moisture.

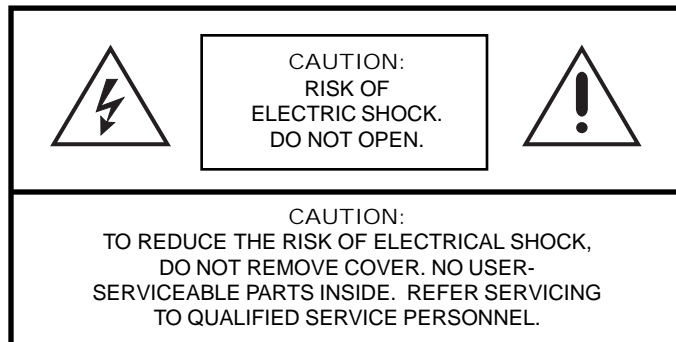
The product and/or manual may bear the following marks:



This symbol indicates that dangerous voltage constituting a risk of electric shock is present within this unit.



This symbol indicates that there are important operating and maintenance instructions in the literature accompanying this unit.



Please thoroughly familiarize yourself with the information in this manual prior to installation and operation.

## 1.2 REGULATORY NOTICES

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

This device requires shielded interface cables to comply with FCC emission limits.

## 1.3 UNPACKING INSTRUCTIONS

Unpack and inspect all parts carefully.

The following parts are supplied:

- 1 Camera
- 1 4-pin plug for lens cable
- 1 Installation/Operation Manual (C1917M)

Be sure to save the shipping carton and any inserts. They are the safest material in which to make future shipments.

If an item appears to have been damaged in shipment, replace it properly in its carton and contact the factory at 1-800-289-9100 or 1-559-292-1981 for a replacement. (International customers fax 1-559-348-1120 for authorization and instructions.)

If an item needs to be returned to the factory for repair, consult the WARRANTY AND RETURN section of this manual for instructions.

## 1.4 RECOMMENDED TOOLS

Pelco does not supply basic tools needed for the installation process. The following tools are recommended:

Small flat and Phillips screwdrivers  
Coaxial cable stripper  
BNC crimp tool

If you will install an auto-iris lens:

Soldering iron  
Wire cutter  
Wire stripper

The CC4700-2 color video camera has the following features:

**Imager**

The camera uses a 1/2-inch CCD (Charge Coupled Device).

**High Sensitivity**

The camera gives a clear picture even under very gloomy conditions.

**CCD Iris Function**

Even when a manual iris lens is fitted, the sensitivity is automatically adjusted according to the incident light level. This keeps the video signal at a suitable level.

**Electronic Shutter Function**

Eight shutter speeds are available for various shooting conditions.

**Lockable to AC power Frequency**

The vertical drive frequency of the camera can be locked to the AC power frequency (60 Hz) instead of the internal clock of the camera (59.94 Hz), avoiding picture roll during camera switching operations.

**Auto-Iris Lenses**

A C-mount auto-iris lens can be used by connecting the lens cable to the camera with the plug that is supplied.

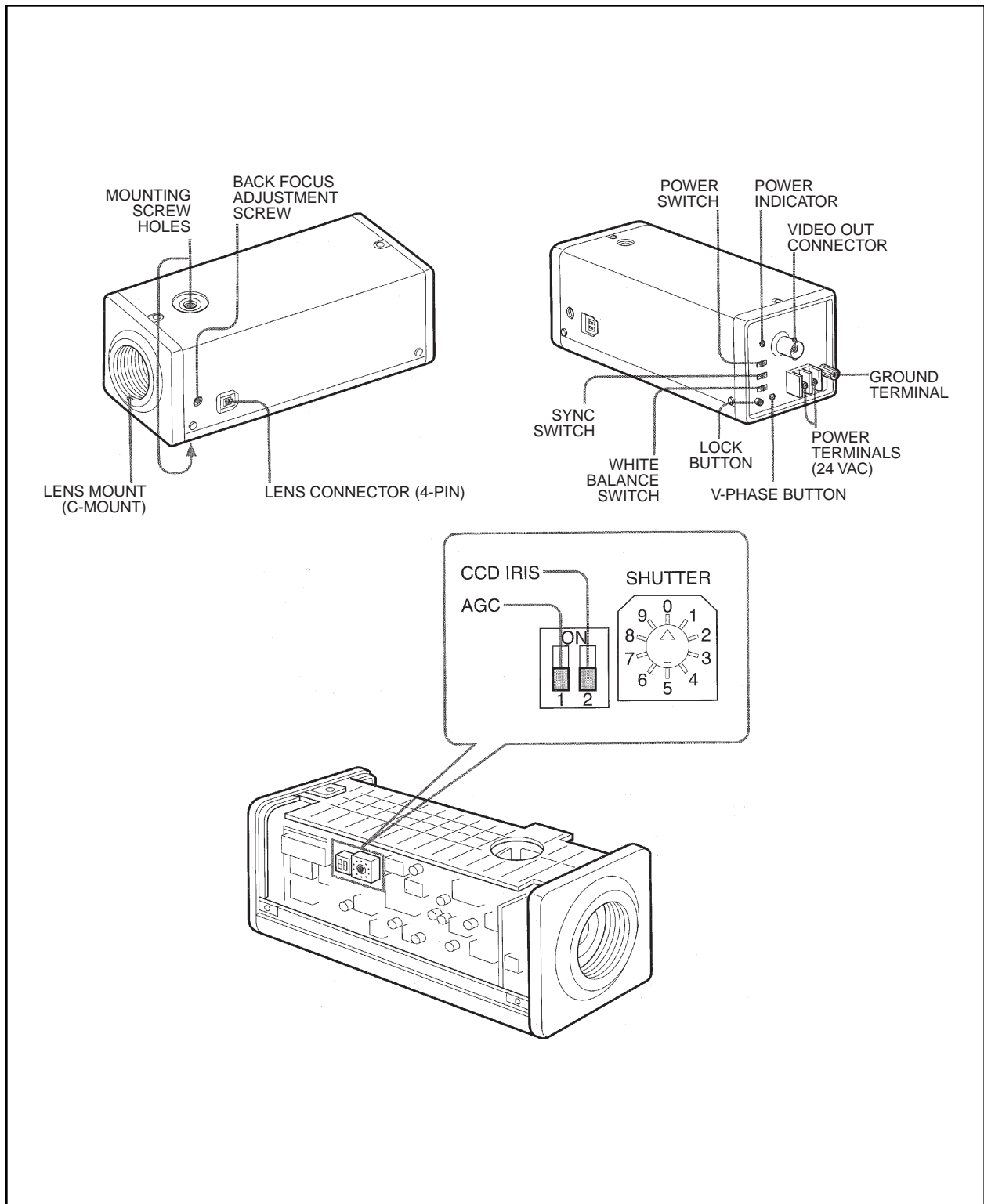
**High Resolution**

The number of CCD picture elements (about 380,000) is sufficient to ensure high resolution.

**Automatic Adjustment of White Balance**

The automatic adjustment mode adjusts the white balance according to a value stored in memory; alternatively, the automatic tracing mode continuously responds to the lighting conditions to adjust the white balance. Thus a picture with an appropriate color balance is always obtained.

### 3.0 LOCATION OF PARTS AND CONTROLS



**Figure 1.** Location of Parts and Controls



## 4.0 INSTALLATION

1. Remove the six (6) Phillips screws that hold the upper cover to the camera body and remove the cover (refer to Figure 2).
2. Set the internal switches according to the conditions in which the camera will be used (refer to Figures 2 and 3).

Switch	Settings
AGC	ON OFF (gain: 0 dB)
CCD IRIS*	ON OFF
SHUTTER	(only effective when CCD IRIS is off) 0: 1/60 s                      4: 1/1000 s 1: 1/100 s                     5: 1/2000 s 2: 1/250 s                     6: 1/4000 s 3: 1/500 s                      7: 1/10000 s

\* When using a manual iris lens, the CCD IRIS function automatically adjusts the shutter speed to maintain a suitable exposure level. Turn this switch off when using an auto-iris lens.

The CCD IRIS function used in the internal synchronization mode (SYNC switch set to INT) may cause unstable color reproduction (slow color changes) to an object shot under fluorescent lighting or unstable (flickering) lighting conditions. If the color changes are too extreme for the picture to be used, turn the CCD IRIS function off and use an auto-iris lens.

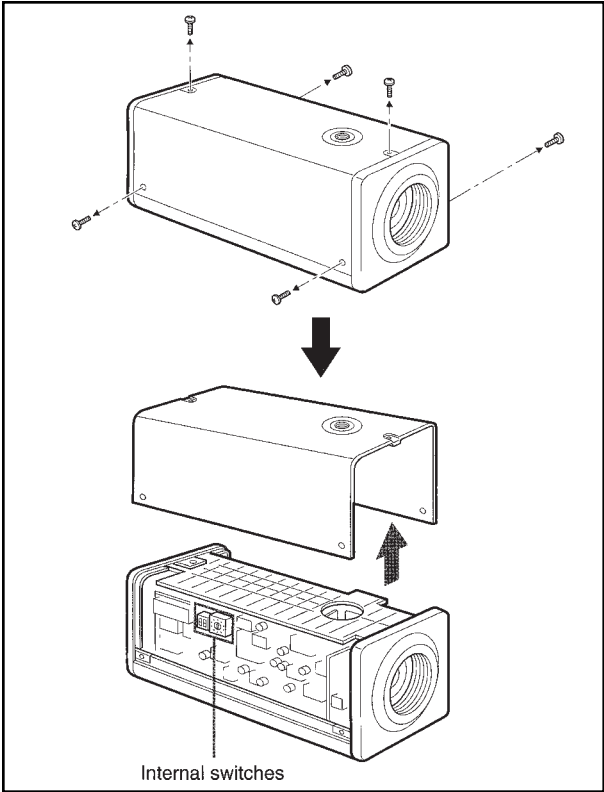


Figure 2. Removal of Camera Cover

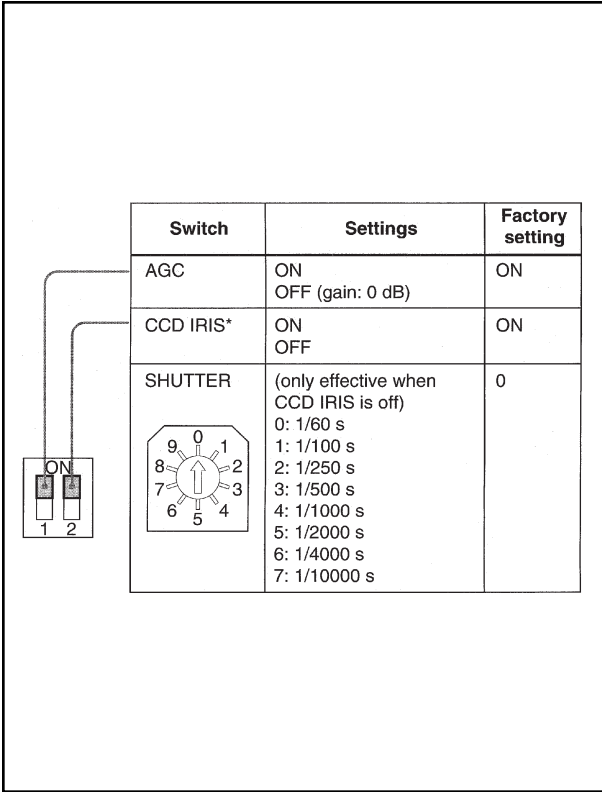


Figure 3. Internal Switch Settings

3. Replace the upper cover on the camera body.
4. Make sure that you have the right type of lens to install on the camera.

The lens must be a C-mount type, and the screw thread must not project more than 9 mm (3/8-inch) from the lens mounting surface (refer to Figure 4).

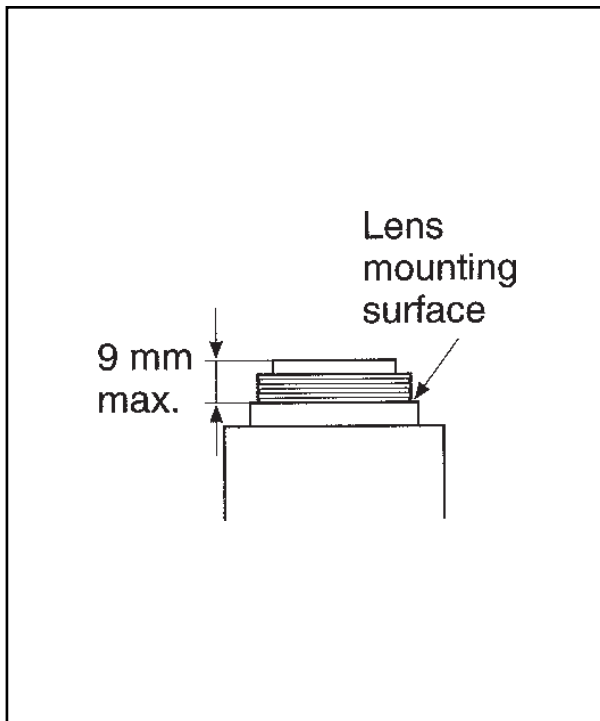
This camera uses a 1/2-inch CCD, so the lens should be for use with this size of CCD. If you use a lens for a 2/3-inch CCD, the angle of view will be different.

5. If you have an auto-iris lens, replace the plug on the lens cable with the plug that is supplied (refer to Figure 5).
  - a. Solder the lens cable wires to the pins on the plug supplied; apply heat after putting heat shrink sleeving on the wires. The pin assignments are as follows.

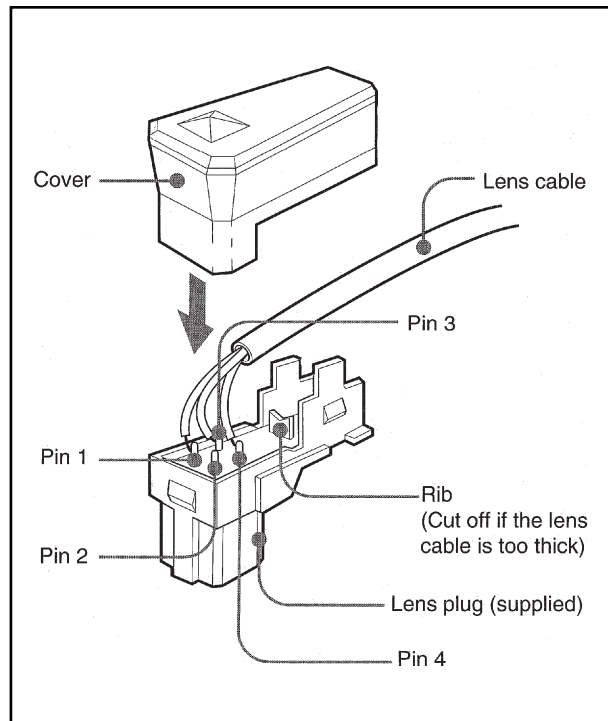
Pin	Signal
1	Power Supply (+9V DC, 50 mA)
2	Unused
3	Video signal output (for auto-iris control; 0.7 Vp-p, 40 k ohms, no synchronizing signal)
4	Ground

Refer to the operation manual for the lens to determine the cable color coding.

- b. Put the cover on the plug.

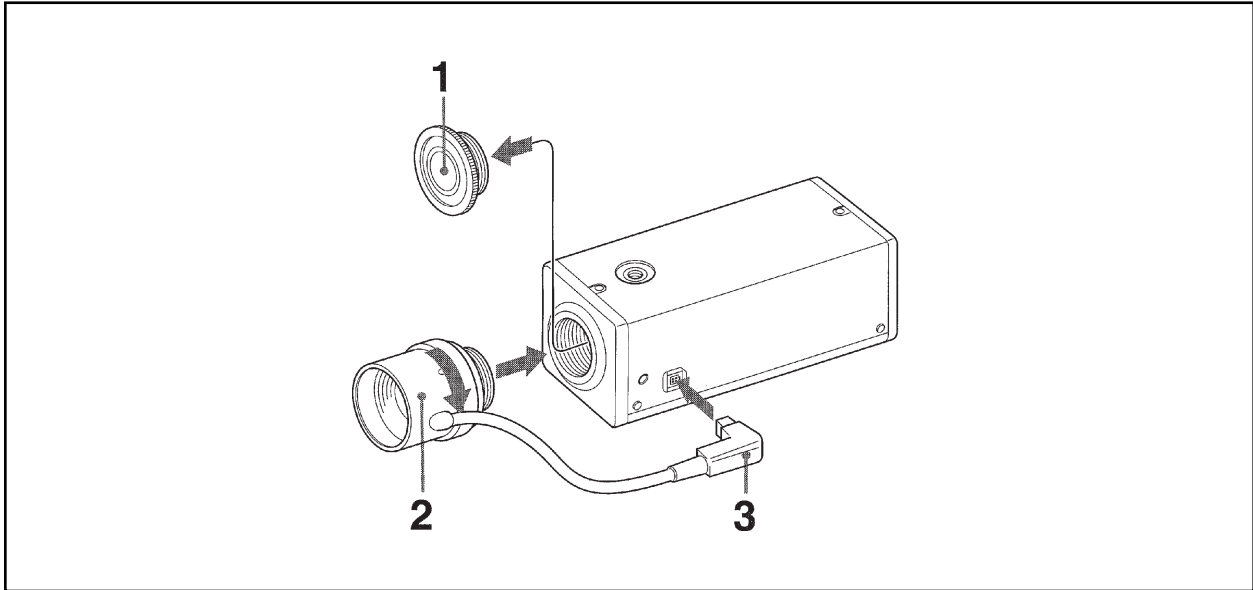


**Figure 4.** Lens Mount



**Figure 5.** Auto-Iris Lens Plug Assembly

6. When using an auto-iris lens, install it as follows. For a manual iris lens, omit step c. Refer to Figure 6.
  - a. Unscrew the lens mount cap (1).
  - b. Screw in the lens (2).
  - c. Plug in the lens cable (3).

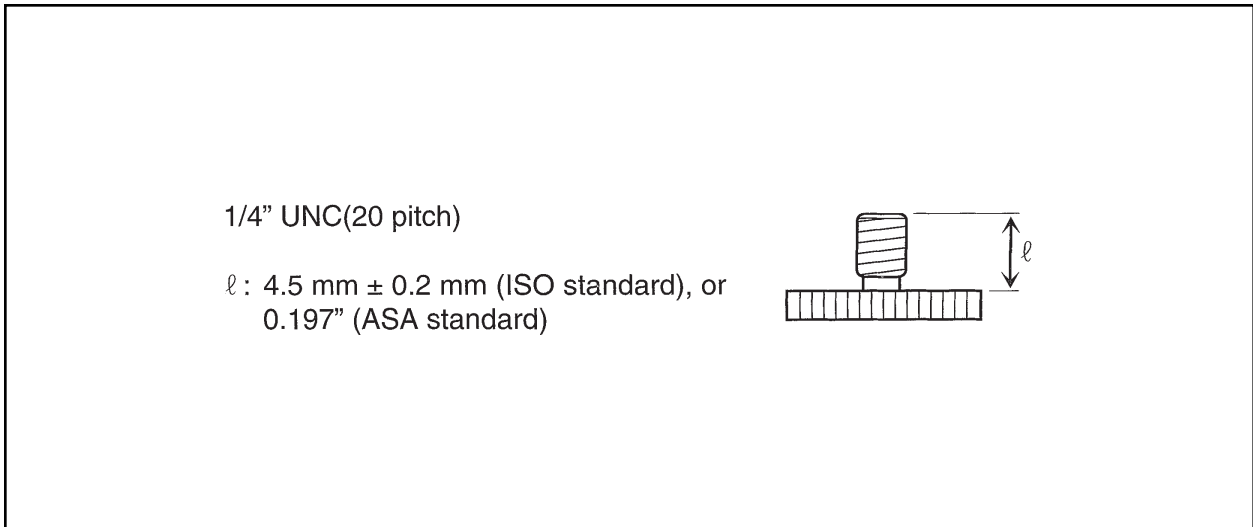


**Figure 6.** Lens Installation

7. Attach the camera to a mounting bracket with a mounting screw of the type shown in Figure 7.

1/4" UNC (20 pitch)

$d = 4.5 \text{ mm} \pm 0.2 \text{ mm}$  (ISO standard), or  $0.197''$  (ASA standard).



**Figure 7.** Camera Mounting Screw

**WARNING:** *Be sure to connect the power and ground leads to the appropriate terminals. Wrong connection may cause malfunction and/or damage to the video camera.*

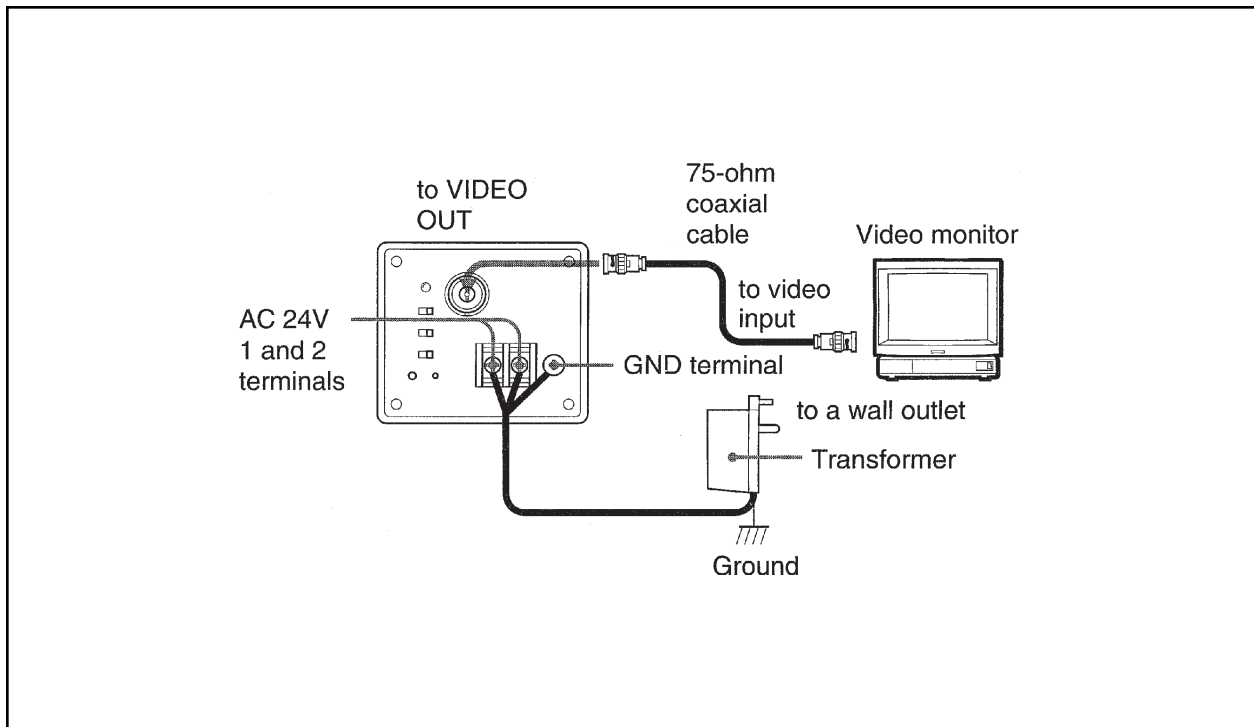
8. Connect power to the camera (refer to Figure 8).

This camera must always be operated with a 24 VAC class 2 power supply. In the U.S.A., use a power supply that is UL Listed. In Canada, use a power supply that is CSA Certified. Refer to Table A for wiring distances.

When using a transformer without a ground lead (two-lead type), connect the output of the transformer to the 24 VAC 1 and 2 terminals of the camera. Connect a ground lead to the GND terminal or an irregular voltage may be generated in the AC power cord and may cause malfunction and/or damage to the video camera.

When using a transformer with a ground lead (three-lead type), connect the ground wire to the GND terminal and the other two wires to the 24 VAC 1 and 2 terminals of the camera.

If you wire more than one camera from the same transformer, connect one side of the transformer to terminal 1 on all of the cameras, and connect the other side of the transformer to terminal 2 on all of the cameras. If all of the cameras are not connected the same, the cameras will be out of phase with each other and may produce what appears to be vertical roll when switching between cameras.



**Figure 8.** Power and Video Connections

**Table A. 24 VAC Wiring Distances**

The following are the recommended maximum distances for 24 VAC applications and are calculated with a 10-percent voltage drop. (10-percent is generally the maximum allowable voltage drop for AC-powered devices.)

EXAMPLE: An enclosure that requires 80 vA and is installed 35 feet (10 m) from the transformer would require a minimum wire gauge of 20 Awg.

NOTE: Distances are calculated in feet; values in parentheses are meters.

	Wire Gauge					
	20	18	16	14	12	10
10	283 (86)	451 (137)	716 (218)	1142 (348)	1811 (551)	2880 (877)
20	141 (42)	225 (68)	358 (109)	571 (174)	905 (275)	1440 (438)
30	94 (28)	150 (45)	238 (72)	380 (115)	603 (183)	960 (292)
40	70 (21)	112 (34)	179 (54)	285 (86)	452 (137)	720 (219)
50	56 (17)	90 (27)	143 (43)	228 (69)	362 (110)	576 (175)
60	47 (14)	75 (22)	119 (36)	190 (57)	301 (91)	480 (146)
70	40 (12)	64 (19)	102 (31)	163 (49)	258 (78)	411 (125)
80	35 (10)	56 (17)	89 (27)	142 (43)	226 (68)	360 (109)
90	31 (9)	50 (15)	79 (24)	126 (38)	201 (61)	320 (97)
100	28 (8)	45 (13)	71 (21)	114 (34)	181 (55)	288 (87)
110	25 (7)	41 (12)	65 (19)	103 (31)	164 (49)	261 (79)
120	23 (7)	37 (11)	59 (17)	95 (28)	150 (45)	240 (73)
130	21 (6)	34 (10)	55 (16)	87 (26)	139 (42)	221 (67)
140	20 (6)	32 (9)	51 (15)	81 (24)	129 (39)	205 (62)
150	18 (5)	30 (9)	47 (14)	76 (23)	120 (36)	192 (58)
160	17 (5)	28 (8)	44 (13)	71 (21)	113 (34)	180 (54)
170	16 (4)	26 (7)	42 (12)	67 (20)	106 (32)	169 (51)
180	15 (4)	25 (7)	39 (11)	63 (19)	100 (30)	160 (48)
190	14 (4)	23 (7)	37 (11)	60 (18)	95 (28)	151 (46)
200	14 (4)	22 (6)	35 (10)	57 (17)	90 (27)	144 (43)

Total vA consumed

Maximum distance from transformer to load

9. Connect a video cable to the VIDEO OUT connector on the camera (refer to Figure 8). Refer to Table B for the type of video coaxial cable to use.

**Table B.** Video Coaxial Cable Wiring Distances

Cable Type*	Maximum Distance
RG59	750 ft (229 m)
RG 6	1,000 ft (305 m)
RG11	1,500 ft (457 m)
* Minimum cable requirements: 75 ohms impedance All-copper center conductor All-copper braided shield with 95% braid coverage	

10. Set the SYNC (synchronization) switch.

INT (internal): for using the internal synchronizing signal.

L.L. (line lock): for locking the camera operation to the supply power frequency as a synchronizing signal. The vertical drive frequency of the camera is locked to the AC power frequency (60 Hz) instead of the internal clock of the camera (59.94 Hz), avoiding picture roll during camera switching operations.

**Proceed to Section 4.1, ADJUSTMENTS.**

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## 4.1 ADJUSTMENTS

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Turn on the camera power and make the following adjustments.

### 4.1.1 White Balance

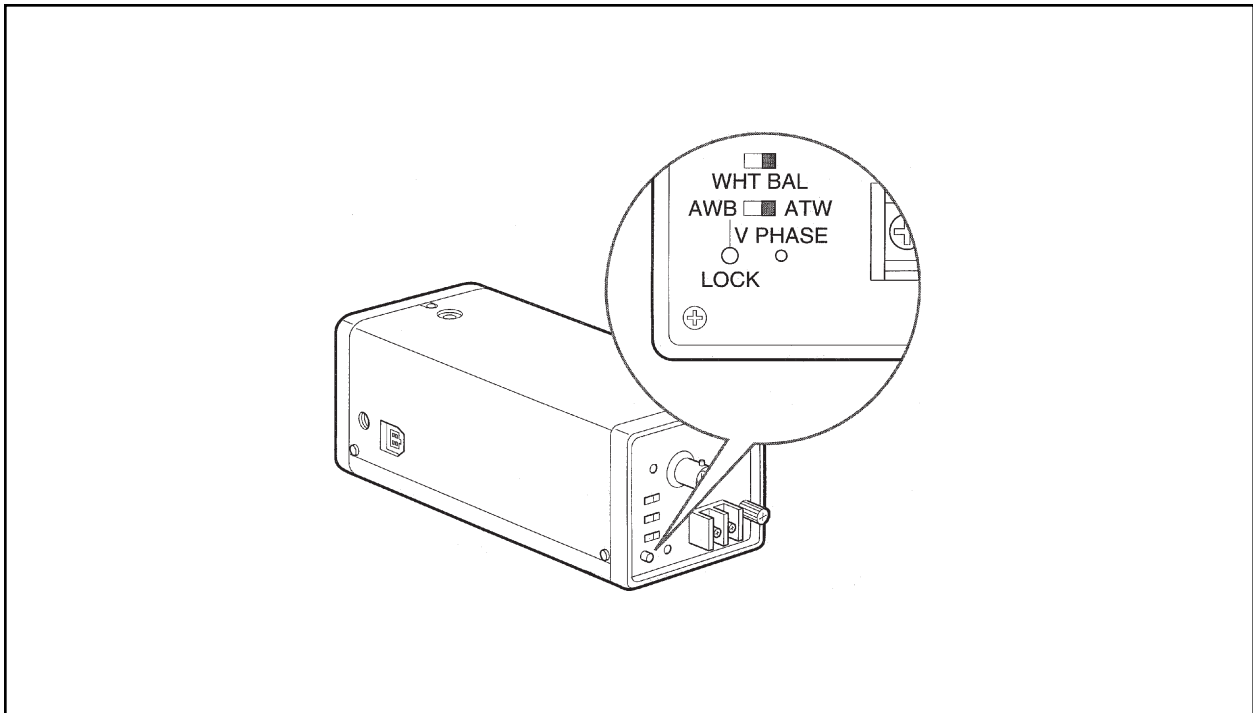
After fitting the lens and making all the installation connections, use a monitor to check the picture and set the white balance as described below (refer to Figure 9).

**AWB (Automatic White Balance) mode:**

This mode is appropriate when lighting conditions are more or less constant. Point the camera at a white object, such as a white wall or piece of white paper, so that the monitor screen is as far as possible all white, then press the LOCK button. This will calculate the current white balance setting and store it indefinitely in memory. Thus there is no need to readjust the white balance after the power is turned off and on again.

**ATW (Automatic Tracing White Balance) mode:**

In this mode the camera continuously adjusts the white balance according to the changing lighting conditions.



**Figure 9.** White Balance Setting

### 4.1.2 Vertical Phase

Use the V PHASE (vertical phase) button to compensate for vertical phase discrepancies that may occur when two or more cameras are used when the SYNC switch is set to L.L. Use the tip of a ballpoint pen or the like to press the button. Each time it is pressed, the line lock position shifts by 60°.

Vertical phase adjustment is not vertical roll adjustment. Vertical phase problems arise when:

1. Switching rapidly between widely separated cameras with manual or sequential switchers.
2. Switching between cameras not operating off the same phase of the AC line.
3. Transformers are wired backward (refer to step 8 in Section 4.0, INSTALLATION).

When the vertical phase is out of adjustment, switching between two cameras may produce what appears to be vertical roll on the monitor. Turning the vertical phase adjustment on the camera, while switching as rapidly as possible between the two camera views, will synchronize the cameras to the same phase of the AC line so that there is no vertical roll or flip when switching between cameras.

### 4.1.3 Back Focus

The camera is shipped with the back focus adjusted to suit almost all lenses. If necessary, turn the BACK FOCUS adjusting screw with a screwdriver to adjust the focal plane. It has a self-locking mechanism, so once adjusted the focus will not drift.

#### **Fixed Lens Models (Indoor Method)**

1. With the camera operating, view an object at least 75 feet away.
2. Set the lens focus ring to infinity.
3. Set the lens iris to its widest usable opening.\*
4. Adjust the back focus to bring the object being viewed into the sharpest focus.

#### **Fixed Lens Models (Outdoor Method)**

1. With the camera operating, view an object at least 200 feet away.
2. Set the lens focus ring to infinity.
3. Use a neutral density filter in front of the lens to insure that the iris is fully open.\*
4. Adjust the back focus to bring the object being viewed into the sharpest focus (the filter must be in place).

\*The lens aperture must be wide open for all back focus adjustment procedures. This can be done in subdued lighting or with filters.



### **Zoom Lens Models**

1. With the camera operating, view an object at least 75 feet away.
2. Make sure the lens iris is wide open.\* If outdoors use a neutral density filter in front of the lens to insure that the iris is fully open.
3. Set the lens focus to infinity.
4. Adjust the lens zoom to extreme WIDE angle.
5. Adjust the back focus to bring the object being viewed into the sharpest focus (the filter must be in place if the adjustment is being made outdoors).
6. Move the lens to extreme TELEPHOTO.
7. Adjust the lens focus (by the controller) for best picture.

\*The lens aperture must be wide open for all back focus adjustment procedures. This can be done in subdued lighting or with filters.

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## 5.0 OPERATION

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Avoid aiming the camera at a very bright object (such as light fixtures) for an extended period.

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## 6.0 TROUBLESHOOTING

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The following conditions that may be observed when using a CCD camera are not associated with any fault of the camera.

**Vertical Smear**

This phenomenon occurs when shooting a very bright object.

**Patterned Noise and Blemish**

This is a fixed pattern which may appear over the entire monitor screen when the camera is operated at a high temperature.

**Jagged Picture**

When shooting stripes, straight lines, or similar patterns, the image on the screen may appear jagged.

**Camera Does Not Operate**

The only service you can perform on the camera is to inspect and change the fuse. To check the fuse, remove the upper cover. If the fuse is bad, replace it with the same type of fuse rated at 125 VAC, 500 mA. If the fuse blows after replacing it, or if there are other problems with the camera, return the camera to Pelco for servicing.

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## 7.0 MAINTENANCE

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Be careful not to spill water or other liquids on the unit, or to get combustible or metallic material inside the body. Foreign material inside the camera could cause it to fail or be a cause of fire or electric shock.

**Avoid operating or storing the unit in the following locations:**

Extremely hot or cold places (operating temperature 14° F to 122° F ; -10° C to 50° C)

Damp or dusty places

Where it is exposed to rain

Locations subject to strong vibration

Close to generators of powerful electromagnetic radiation such as radio or TV transmitters

Remove dust or dirt on the surface of the lens or optical filter with a blower.

Clean the body with a dry soft cloth. If it is very dirty, use a cloth dampened with a small quantity of neutral detergent, then wipe dry. Avoid the use of volatile solvents such as thinners, alcohol, benzene, and insecticides. They may damage the surface finish, or impair the operation of the camera.

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## 8.0 SPECIFICATIONS

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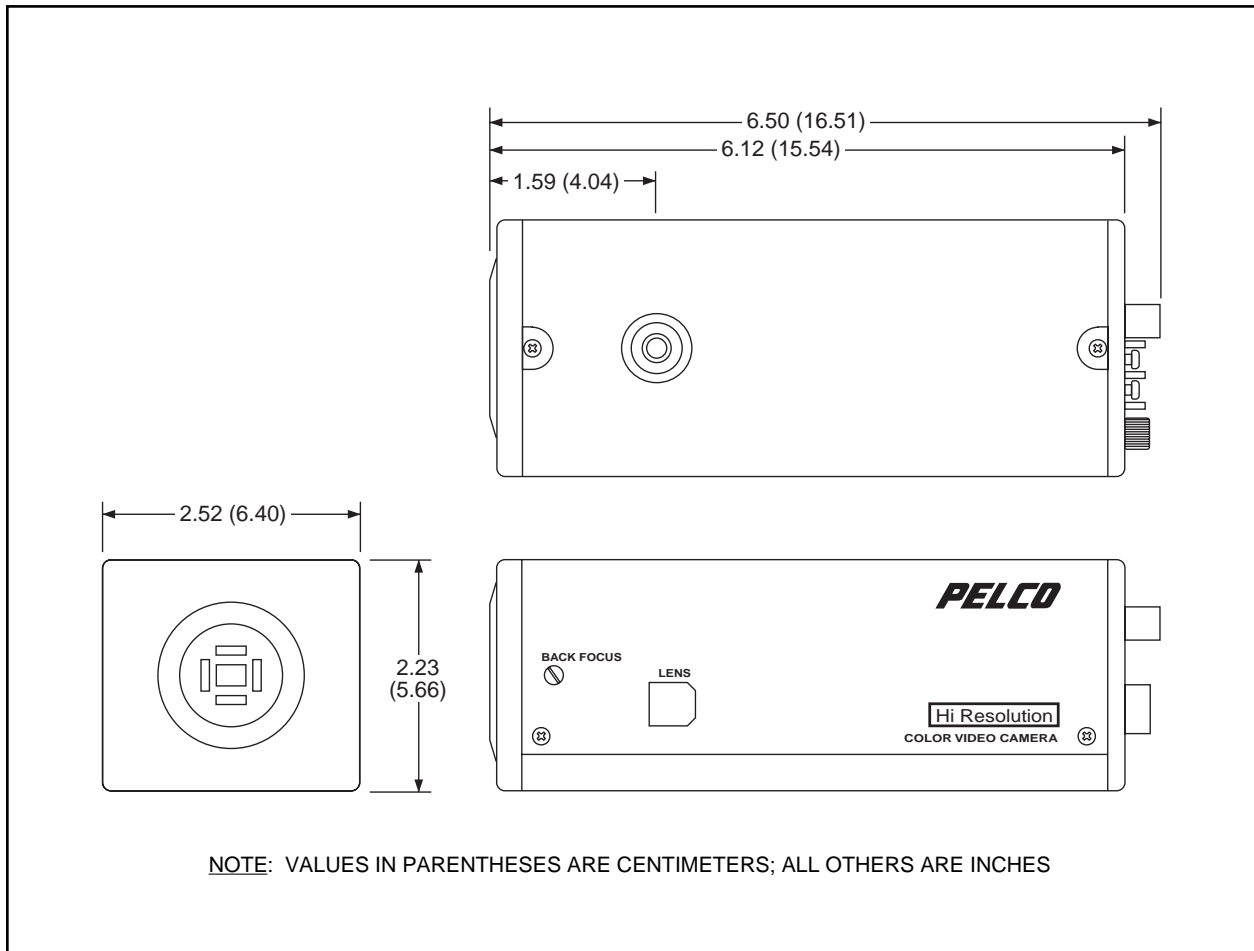
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Pickup Device:	1/2-inch interline transfer type CCD
Effective Picture Elements:	768 (H) x 494 (V)
Sensing Area:	6.3 x 4.7 mm (1/4 x 3/16 inch)
Lens Mount:	C mount
Signal system:	NTSC standard
Scanning System:	525 lines, 2:1 interlace, 30 frames per second
Synchronization:	Internal or line-lock
Horizontal Resolution:	470 TV lines
Minimum Illumination:	2.5 lux at f/1.2 (AGC on)
Video Output:	1.0 Vp-p, 75 ohms, sync negative
Video Signal-to-noise Ratio:	48 dB minimum (AGC on)
Electronic Shutter:	8 settings: 1/60 s, 1/100* s, 1/250 s, 1/500 s, 1/1000 s, 1/2000 s, 1/4000 s, 1/10000 s
White Balance:	AWB (Automatic White Balance) and ATW (Automatic Tracing White Balance), switchable
AGC:	Switchable on and off
Input and Output Connectors:	24 VAC: two terminals GND VIDEO OUT: BNC type LENS: 4-pin connector
Power Requirements:	24 VAC $\pm$ 10%, 60 Hz
Power consumption:	4.9 W
Operating Temperature:	14° F to 122° F (-10° C to 50° C)
Storage Temperature:	-40° F to 140° F (-40° C to 60° C)
Relative Humidity (operating):	20% to 80%
Relative Humidity (storage):	20% to 95%
Shock Resistance:	70 G (686.5 m/s <sup>2</sup> )

\* Flickerless mode

Dimensions: See Figure 10  
 Weight: 660 g approx. (1 lb 7 oz)  
 Fuse: 125 VAC, 500 mA

*(Design and product specifications subject to change without notice.)*



**Figure 10.** CC4700-2 Dimension Drawing

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## 9.0 WARRANTY AND RETURN INFORMATION

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### WARRANTY

Pelco will repair or replace, without charge, any merchandise proved defective in material or workmanship for a period of one year after the date of shipment.

Exceptions to this warranty are as noted below:

- Five years on FT/FR8000 Series fiber optic products.
- Three years on Genex® Series products (multiplexers, server, and keyboard).
- Three years on Camclosure® and fixed camera models, except the CC3701H-2, CC3701H-2X, CC3751H-2, CC3651H-2X, MC3651H-2, and MC3651H-2X camera models, which have a five-year warranty.
- Two years on standard motorized or fixed focal length lenses.
- Two years on Legacy®, CM6700/CM6800/CM9700 Series matrix, and DF5/DF8 Series fixed dome products.
- Two years on Spectra®, Esprit®, ExSite™, and PS20 scanners, including when used in continuous motion applications.
- Two years on Esprit® and WW5700 Series window wiper (excluding wiper blades).
- Eighteen months on DX Series digital video recorders, NVR300 Series network video recorders, and Endura™ Series distributed network-based video products.
- One year (except video heads) on video cassette recorders (VCRs). Video heads will be covered for a period of six months.
- Six months on all pan and tilts, scanners or preset lenses used in continuous motion applications (that is, preset scan, tour and auto scan modes).

Pelco will warrant all replacement parts and repairs for 90 days from the date of Pelco shipment. All goods requiring warranty repair shall be sent freight prepaid to Pelco, Clovis, California. Repairs made necessary by reason of misuse, alteration, normal wear, or accident are not covered under this warranty.

Pelco assumes no risk and shall be subject to no liability for damages or loss resulting from the specific use or application made of the Products. Pelco's liability for any claim, whether based on breach of contract, negligence, infringement of any rights of any party or product liability, relating to the Products shall not exceed the price paid by the Dealer to Pelco for such Products. In no event will Pelco be liable for any special, incidental or consequential damages (including loss of use, loss of profit and claims of third parties) however caused, whether by the negligence of Pelco or otherwise.

The above warranty provides the Dealer with specific legal rights. The Dealer may also have additional rights, which are subject to variation from state to state.

If a warranty repair is required, the Dealer must contact Pelco at (800) 289-9100 or (559) 292-1981 to obtain a Repair Authorization number (RA), and provide the following information:

1. Model and serial number
2. Date of shipment, P.O. number, Sales Order number, or Pelco invoice number
3. Details of the defect or problem

If there is a dispute regarding the warranty of a product which does not fall under the warranty conditions stated above, please include a written explanation with the product when returned. Method of return shipment shall be the same or equal to the method by which the item was received by Pelco.

### RETURNS

In order to expedite parts returned to the factory for repair or credit, please call the factory at (800) 289-9100 or (559) 292-1981 to obtain an authorization number (CA number if returned for credit, and RA number if returned for repair).

All merchandise returned for credit may be subject to a 20% restocking and refurbishing charge. Goods returned for repair or credit should be clearly identified with the assigned CA or RA number and freight should be prepaid. Ship to the appropriate address below.

If you are located within the continental U.S., Alaska, Hawaii or Puerto Rico, send goods to:

Service Department  
Pelco  
3500 Pelco Way  
Clovis, CA 93612-5699

If you are located outside the continental U.S., Alaska, Hawaii or Puerto Rico and are instructed to return goods to the USA, you may do one of the following:

If the goods are to be sent by a COURIER SERVICE, send the goods to:

Pelco  
3500 Pelco Way  
Clovis, CA 93612-5699 USA

If the goods are to be sent by a FREIGHT FORWARDER, send the goods to:

Pelco c/o Expeditors  
473 Eccles Avenue  
South San Francisco, CA 94080 USA  
Phone: 650-737-1700  
Fax: 650-737-0933

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